

Application Number 10/799043
Response to the Office Action dated 03/27/2008

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REMARKS

Favorable reconsideration of this application is requested in view of the above amendments and the following remarks.

Claim 1 has been amended to add a limitation as supported by the specification at page 5, lines 1-12; accordingly, claim 3 has been canceled without prejudice.

Claim 4 has been amended as supported by original claim 4 and the specification at page 5, lines 13-16.

Claims 1-4 and 6-9 have been rejected under 35 U.S.C. 102(b) as being anticipated by, or in the alternative, under 35 U.S.C. 103(a) as being obvious over Negami et al. (U.S. Patent No. 6,259,016). Applicants respectfully traverse this rejection.

Negami discloses a compound including oxides expressed by a general formula $Zn_{1-x}A_xO$ (where element A is at least one selected from Be, Mg, Ca, Sr, and Ba, and $0 < x < 1$) (see coln. 5, lines 46-50). The reference lists Mg, which specifically is required in the present claim 1, merely as an alternative with Be, Ca, Sr, and Ba and fails to disclose any embodiment that includes Zn, Mg, O, and at least one additional element that claim 1 requires. In the invention of present claim 1, Mg is added to a ZnO layer in order to optimize the conduction band offset between the light absorption layer and the window layer and in addition, Zn:Mg:O (1-x : x : 1) is necessary to remove a buffer layer (see page 1, lines 20-27 and page 4, lines 21-27 of the specification). Further, in present claim 1, an additional element M is added to the solar cell in order to solve a problem of increasing the volume resistivity and decreasing the electrical conductivity that occurs when Mg simply is added to the ZnO layer (see page 1, lines 29-34; page 3, lines 17-19 and 26-30; and page 5, lines 1-8). Therefore, adding an element M to the solar cell in addition to Mg provides results that are not expected from the disclosure of the reference.

In addition, Negami discloses that the amount of Mg and/or Ca, Sr, and/or Ba (hereinafter "Ca, Sr, and/or Ba" referred to as M'; and "Mg, Ca, Sr, and/or Ba" (i.e., Mg and M') referred to as A) is between 0 and 1 (see coln. 5, lines 46-50). However,

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controlling the amounts of Mg and M' in a narrower range is important because adding Mg increases the volume resistivity as discussed above and a trace amount of M' can reduce the volume resistivity. However, a larger amount of M' also increases the volume resistivity. Therefore, the invention of claim 1 controls the amount of Mg (x) between 0.05 and 0.35 in the ratio of Zn:Mg:O (1-x : x : 1) and the amount of M' between 0.01 and 3 atom percent. In contrast, the reference discloses the amount of A between 0 and 50 atom percent. Although Negami discloses the preferable lower limit 0.1% of A (see coln. 5, lines 50-51), the reference does not disclose the upper limit below 50 % (when x = 1). When a considerably narrower range is claimed, the reference must disclose the narrower range with sufficient specificity to anticipate the claimed range, and any evidence of unexpected results within the narrow range may render the claim unobvious. Atofina v. Great Lakes Chem. Corp., 441 F.3d 991, 999-1000, 78 USPQ2d 1417 (Fed. Cir. 2006). In the present case, Negami in no way leads one of ordinary skill toward the narrower range of the amounts of Mg and M' in claim 1, nor does it provide any reasonable basis for expecting the benefits seen with the claimed range.

Accordingly, claim 1 is distinguished from Negami, and the rejection of 1-4 and 6-9 should be withdrawn.

In view of the above, Applicants request reconsideration of the application in the form of a Notice of Allowance.

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Respectfully submitted,

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